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The Comparative Analysis of outgoings for R&D Activities in Turkey for 2014

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Abstract

Expenses for R&D activities and the expenses which are done for these activities and its portion in GDP is the key to developed the economy of the country and the ability to make an innovation. Theoretically, including R&D studies into economic growth was done by the studies of Romer and Lucas in between 1986-1988. Remaining competing conditions with globalizations and technology-intensity production have necessitated to give more importance to R&D activities. Technological innovations can increase the competitiveness of a company; it expands the share of the market. It has tried to be identified by examining the expenses of R&D in public, mercantile establishments and universities in Turkey for the year 2014 that which expense isn't enough and which expense should be doubled. As a result, it will be easier to develop new solutions.

Keywords: R&D, technological innovation, competitive strength

1. Introduction

Expenses for R&D activities and the expenses which are done for these activities and its portion in GDP is the key to developed the economy of the country and the ability to make an innovation. Theoretically, including R&D studies into economic growth was done by the studies of Romer and Lucas in between 1986-1988. Remaining competing conditions with globalizations and technology-intensity production have necessitated to give more importance to R&D

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activities. Technological innovations can increase the competitiveness of a company; it expands the share of the market. It also contributes to rise of its profitability (Korkmaz, 2010) . the countries which don't give enough importance to R&D studies in GDP, will not be able to make technology-based productions and they will lose their competitive capacities.

Economic enlargement which is one of the basic problems of macro economy affects both men standard of living and their standards of welfare (Miroslav, Boris ve Mitja, 2009). R&D expenses are important criteria to evaluate countries' competitiveness and economic development with many ways such as innovation, accumulation of funds and growing in human capital **(**Bor, Chuang, Laive Yang, 2010). In long-run, R&D is the key of both welfare and productivity (Jones, ve Williams, 2000). R&D investments provide the companies to have higher technological standards; this leads to increase in income and it also prompts extension **(**Bilbao-Osorio, Rodríguez-Pose, 2004). When companies spend money they both take into consideration the factors that come from the companies' own structures and general factors (Pamukçu, Utku-İsmihan, 2009).

Countries factor productivity is not only bound to R&D payments that are done on their owns, but also it is related to the founds of R&D(Coe, Helpman, 1995). Increasing in wasted sources for R&D will render fertility and payments (Sylwester, 2001).

2. The Concept of Survey and Improvement

According to manual of OECD Frascati, survey ant experimental improvement are redoubling of knowledge which are formed with human culture and knowledge of society and they are the creative studies which are carried out to apply new applications in a systematic way (OECD Publications, 2002).

According to manual of OECD Frascati, the term of RD involves three elements;

1-)Basic Research**;** It is an experimental or theoretical study that superficially there is no special application or usage and primarily they are used to know something about new information related to the fundament of viewable facts.

2-) Practical Research; It is a study for producing new information. In addition to this, that is basically aim oriented with particular practice.

3-) Experimental Development; It is a study of producing new product materials or equipments with the help of research and/or practical experiments. It also aims to constitute new processes, systems and employments or it intends to develop the current ones substantially.

3. The Development of R&D Activities

When the development of R&D activities have been searched it has seen that the basic institutional R&D development had occurred in Germany by 1870.According to Freeman and Soete, companies like Hoechst, Bayer and BASF have contributed to this development (Türkcan, 2003).In historical process, the effect of the World War 2 has been mentioned. In this developing process, R&D activities which were done sporadically, amateurish and in a precarious way in 19th century reached a vast criterion, scientific contents and dimension of professional specialization (Barutçugil, 1981).

4. Aim and Technique of Research and Evaluation of Evidence

4.1. Aim and Comprehention of Research

R&D activities of public and private sectors and expenses on these activities have been examined. It has tried to be identified by examining the expenses of R&D in public, mercantile establishments and universities in Turkey that which expense isn't enough and which expense should be doubled. As a result, developing new resolution strategies will be easier.

4.2. Process of Research

The statistics of R&D done by TUIK in Turkey are gathered together with the help of annual survey and administrative registration information which are applied in public, mercantile establishments and universities. Public sector R&D data is gathered by post. Administrative registration R&D data is composed annually by face to face interview with area managers of TUIK. R&D data of universities is combined by annual surveys and administrative registration information.

Gathered and published basic variable components, advice for composing and interpretation of R&D are done in conformity with manual of Frascati.

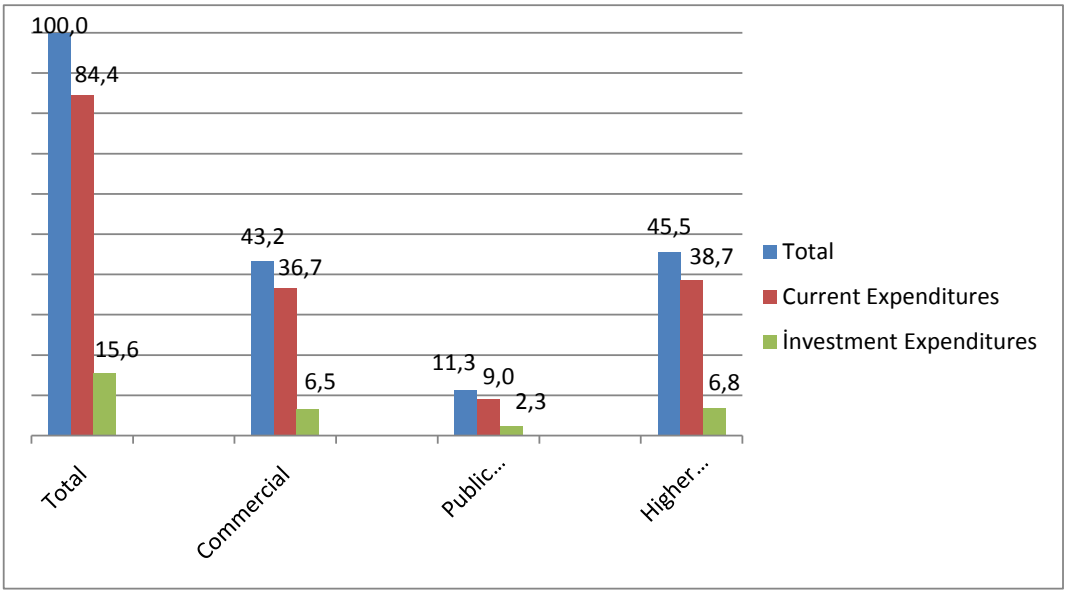
4.3. Diagnosis of Research and Evaluation

Below, the amount of consumption for R&D activities according to its sectors in Turkey, art of universities economic activities of commercial section, regions and socio-economic aim of public sectors are interpreted in separet headlines with graphics.

4.3.1. R&D Expenses in Turkey according to expenses group and sectors

RD expenses around Turkey, according to expense group and sectors are given below graphic. The sectors will come under commercial, public and higher education.

Chart 1. Distribution of Gross Domestic RD Expenses according to sectors and Expense



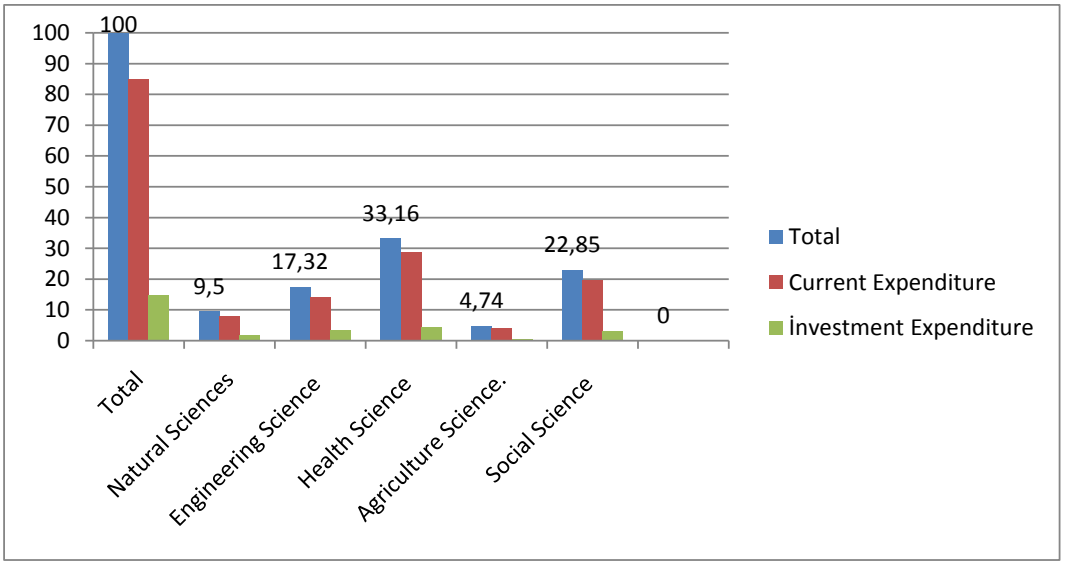
When the first chart is examined, it is seen that higher education sectors has the highest ration with %45,5 in sectors and expense groups. The following one is commercial sector with %43,3. The lowest ration belongs to public sector (%11,3).

One of the important matters here is that the marked difference between current and investment expenditures. Why the expenditures of higher education sectors for R&D is bigger than the expenditures of commercial and public sector's can be clarified by escalation of techno towns with collaboration of universities in recent years and going into operation of R&D units of techno towns % 84,4 of Gross domestic R&D expenditures of sectors consist of investment expenditures.

4.3.2. R&D expenditures of higher education foundations according to art and expense group

Higher education institution has the highest level of expense according to art and expense group in accordance with TUIK data in 2011 is given below. Art comes under: hard-science, engineering science, health science, agriculture science and social-science.

Chart 2. R&D expenses according to science and expense groups

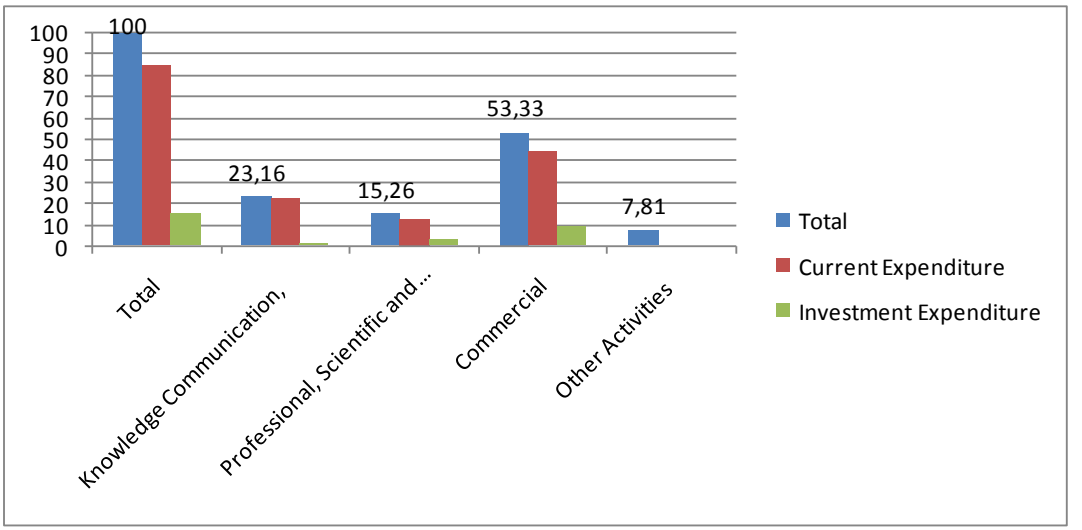


When the second chart is reviewed, it is seen that %33,16 of RD expenses of higer education according to science belongs to health science %22,85 belongs to social science %17,32 relates to engineering science %9,5 pertains to hard-science and %4,74 reverts to agriculture science. As can be seen in the chart, it is claimed that the reason why the health science has the highest ration (%33,16) is that the growing RD activities in investigation hospitals which belong to universties.According to investigation of RD in 2011, it is seen that universities having the highest level of expenditure, have wasted much of their money on investment.

4.3.3. RD expenses of commercial sector according to economic activity and expense group

In this part of the study, RD expenses related to economic activity and expense group are examined according to RD research activities in 2011. RD expenses are examined under the title of knowledge and communication, professional scientific and technical activities, manufacturing and other titles.

Chart 3. R&D expenses of commercial sector according to economic activity and expense group

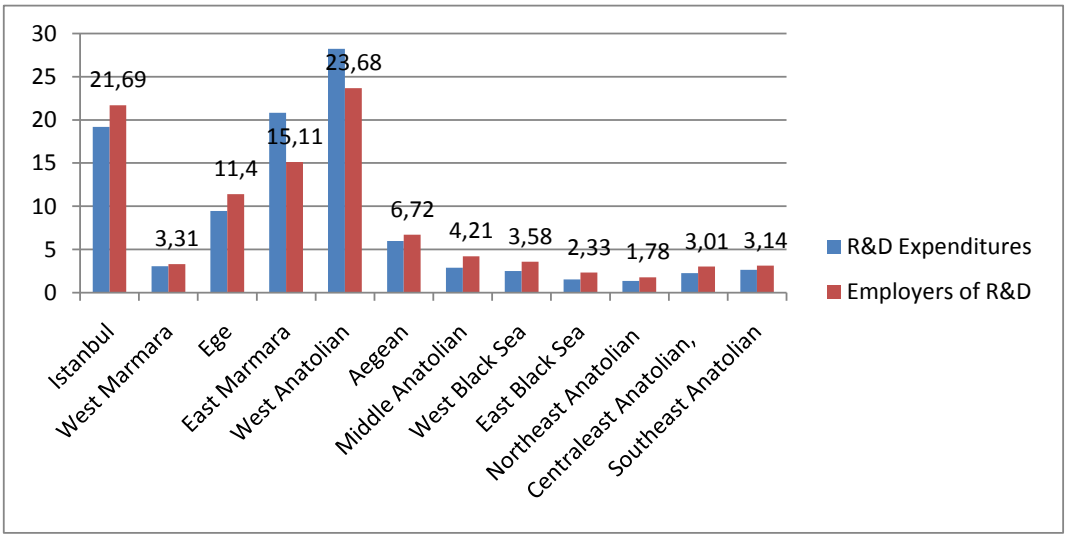


When the third chart is examined, it can be seen that %53 of R&D expenses of commercial sector according to economic activity and expense group is for manufacturing, % 23, 6 is for knowledge communication, % 15, 26 is for professional, scientific and technical activities. The last %7,81 is for other activities obtaining water, electricity, gas production and distribution, construction, wholesale and retail trade, activities of accommodation, food service, finance, insurance, administrative services and support services. It is also seen that %85 of R&D expense group consists of investment expenditures. To expend it widely for manufacturing is quite important for Turkey in a way for taking a step to technology-based production.

4.3.4. Gross Domestic Expenditures of R&D According to Regions

Gross Domestic Expenditures of R&D according to TUIK (Turkey Statistical Institute) 2011 R&D research activities; related to the classification of first-level statistical region units are given below. In accordance with EU harmonization process of Turkey, in pursuance of 2002-4720; Turkish Statistical Institute and State Planning Organization have carved out a region in three different levels for nomenclature of units for territorial statistics. According to level-1, Turkey is divided into 12 sub-regions (TUİK, 2013).

Chart 4. Gross Domestic Expenditures of R&D according to Level-1 nomeclature of units for territorial statics



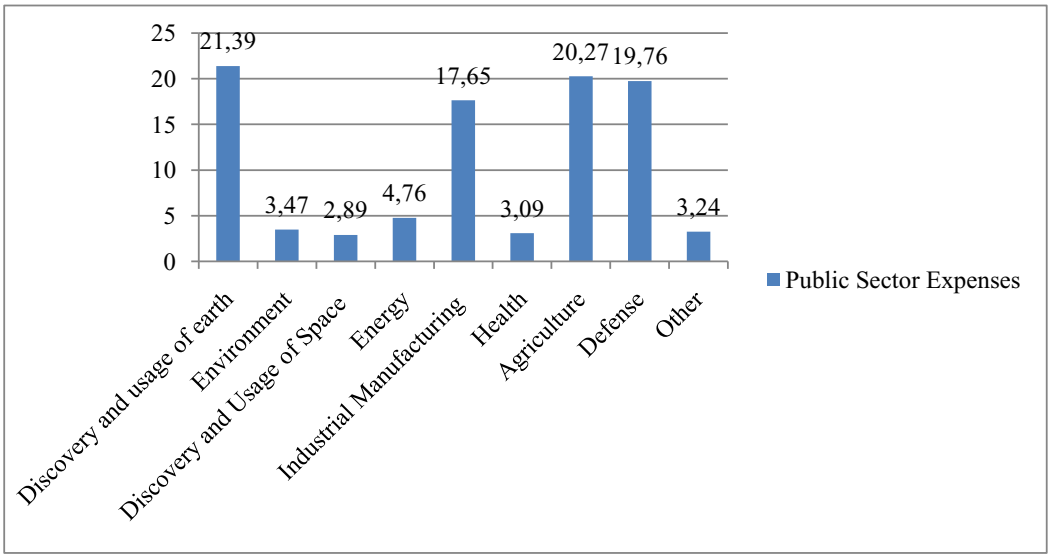
When the fourth chart is examined, %28,21 of R&D expenses is spended for West Anatolian , %19,2 is for Istanbul, %20,84 is for East marmara,%9.47 is for Aegean,%3,5 is for West Marmara, %2,88 is for central Anatolian, %2,64 is for Southeast Anatolian,%2,52 is for West Black sea region, %2,25 is for central east Anatolian, %1,54 is for east Black sea region and %1,37 is for Northeast Anatolian . Nevertheless, %23,68of employers of R&D are hired in west Anatolian regions, %21,69 are hired in istanbul,%15,11 are in east Marmara ,%11,4 are in Aegean, %3,31 are in west Marmara, %4,21 are in Central east Anatolian ,%3,58 are in west Black sea , %3,1 are in central east Anatolian, %2,33 are in East Black sea Region, %1,78 is in Northeast Anatolian.

As a result of growth in importance of R&D and growth in R&D activities has enhanced the need of R&D staff. Accordingly, the number of scientist, engineer and expert has increased. Solely, the government should develop a policy and it should direct the human sources influentially in order to meet the coming demand.

4.3.5. R&D Expenses of Public sector related to socio-economic Aims

In chart 5, R&D expenses of public sector related to socio-economic aims are seen. Socio-economic aims are examined under the tittle of discovery and usage of earth, environment , discovery and usage of space energy;industial manufacturing and technology, health, agriculture, defense and others.

Chart 5. Public sector Expenses according to Socio-economic aims



When the fifth chart is observed, %20,02 of public sector R&D expenses according to socio-economic aims dispended for agriculture, %19,76 is for defence, %17,6 is for industrial manufacturing and technology, %4,76 is for energy, %3,47 is for environment, %3,09 is for health, %2,89 is for discovery and usage of space and %3,24 is for other socio-economic aims .the reason of having a great amount of the R&D expenses in discovery of space, defense, industrial manufacturing is to have high amount of cost for those expenses.

It is also thought that an R&D expense of agriculture sector is high because of raise in support for that sector.

5. Conclusion and Suggestions

The importance of R&D expenses has been increasing since traditional growth theory. According to growth economics,techonology is an indispensable factor for countries in order to develop. Since classical hypothesis which was presented by Adam Smith , although the importance of technology has been accepted; technology hadn't taken apart in economics growth hypothesis till R.Solow's studies.

The theory of Robert Solow is criticized because he accepted technology as an exterior factor, but the theory interior growth which was found by Romer(1986) gave place to manpower, R&D activities and technological development in theory and he claimed that growth can be done by such interior sources. Not only the countries in macro level, but also the firms in micro level have to be open for innovations in order to stand still and be successful in competitive environment, but for this innovations and changing process; the amount of the money for R&D and qualified labour force should be enhanced. not having enough expenses; especially for R&D expenses for public sectors, minimalize governments making innovation capacity and lowers competitive capacity at an international level.

It is thought that, the existence of investigation or research hospitals within universities is the reason for spending much of R&D expenses of higher education foundation on health. One of the obstacles in front of agriculture sector is not having enough level of R&D activities expenses on agriculture and hard-science. Manufacturing industry has an important part in our economy but most of the products produced in that sector are medium-technology products. In order to pass advanced-intensity technology, increasing R&D expenses in producing industry of commercial sector will augment competitive capacity of private sector globally. As to the classification of a territorial unit for statistics level-1, why the regional differences are high is remarkable. In this regard, RD expenses for east Anatolian, Southeast Anatolian and the Black sea should be adequated in order to clear off regional differences. According to socio-economic aims; in addition to defence, industrial production, discovery and usage of earth which are a price; health, discovery and usage of space should be redounded. By enhancing RD expenses which have especially renewable energy potential, staffing expert personnel for RD should be increased.

From this point forth, great amount of RD expenses in Turkey is done by universities. This ratio is bigger when it is compared to other countries. In other countries, RD activities of private enterprise spear heads, RD based technology

management, informatics management, RD leaders who are specialized in directing of RD should be trained, thus there is no need for time and money to discover the discovered one and the problems should be analysed profoundly, details that can make difference may be seen. As a result, innovative products that have competitive advantage can be produced.

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